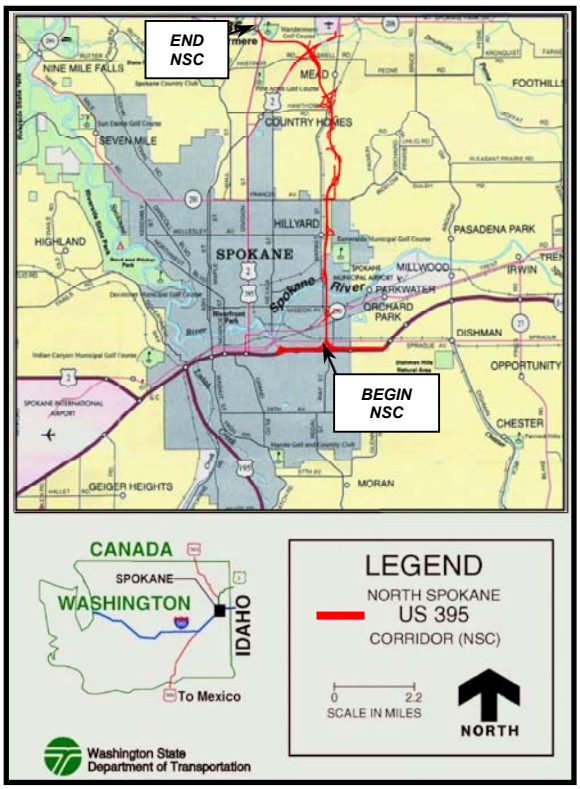
2003 VALUE ENGINEERING AWARD

I-90 and Collector-Distributor System - US 395 North Spokane Corridor

PROJECT BACKGROUND

The North Spokane Corridor (NSC) Project is located in the Northeast quadrant of the City of Spokane, extending north into Spokane County. This 10.4 mile multi-modal transportation facility connects directly to I-90 just west of the Thor/Freya Interchange, then progresses north to connect with US 395 near Wandermere. The NSC route forms a seamless connection among three highways of national significance; Interstate 90 (I-90) on the south, together with US 2 and US 395 on the North. The NSC will ultimately provide a 60 mile per hour, fully controlled access highway between I-90 and Wandermere. The total estimated cost for this project is approximately $1.4 billion.



VALUE ENGINEERING SUMMARY

A unique Value Engineering (VE) process was developed to study the North Spokane Corridor (NSC) Project along I-90 from the vicinity of Liberty Park to Sprague Avenue and associated collector - distributor system over a 24 month period. Because of the complexity of the project and the number of groups involved, (Federal, State, City, County, Businesses and Community's), two processes of public input were used to achieve the goals of an efficient transportation system and the concerns of the community together into one plan.

The first process was the formation of a Design Advisory Group (DAG). This Design Advisory Group provided an innovative method of soliciting input from various technical and non-technical expertise sources and was used over an extended period at key points during the development of the conceptual design alternatives in a concerted effort to stay aligned with the desires of the public and jurisdictional stakeholders. Throughout the duration of the DAG, each member of the team was asked to share the information from the DAG meeting with their constituents and bring feedback to the project team. If the input could not be included into the design, the DAG was given documentation of the reasons why. The DAG was made up of members of City Traffic and Planning, Spokane County, Washington State Department of Transportation Traffic, Planning, and Environmental, Spokane Regional Transportation Council, Spokane Transit Authority, Spokane Community College, Community Colleges of Spokane, East Central and Chief Garry Neighborhoods, representatives from Business, Federal Highways Administration, and a Transportation Design Consultant from CH2M Hill that the State brought on to help in the design process.

The second process consisted of the team who developed the various design and access options for the VE process based on suggestions and comments gathered from the Design Advisory Group and public meetings. Since the Corridor project was too large and complex, a normal weeklong VE study would not be able to fully investigate the different design and access issues. It was decided to spread the VE study out over an extended period, to better develop alignments, address neighborhood and Agency concerns, and investigate design and access alternatives.

VALUE ENGINEERING JOB PLAN

Selection Phase (1991-1997):

The project has an approved Final Environmental Impact Statement (FEIS), dated 1997 & Final Supplemental Environmental Impact Statement (FSEIS), dated 2000.

Investigation Phase (October 2000 – November 2000):

The team's objective was to design a facility that separated the impact of secondary traffic from the I-90 mainline traffic by the creation of a collector - distributor system adjacent to I-90. Additionally, the team was to design the connection between I-90 to the North Spokane Corridor and review the planned access points, to consider the need for additional access points and to maximize operational flexibility for the transportation corridor by developing recommendations compatible with the surrounding environment, land uses, and Regional transportation plans.

During this phase, the team identified numerous constraints to the project and the basic functions of the project, which were to improve mobility, improve safety, improve access points, and consider public concerns expressed through the public involvement process. The team identified constraints as neighborhoods, schools, environmental mitigation areas, businesses, parks, and public utilities. The FEIS design was selected to use as a basis of comparison.

Speculation Phase (November 2000 – September 2001):

During this phase the team brainstormed numerous alignments and interchange configurations based on the constraints of the project.

The first official Design Advisory Group meeting was held in November 2000, at which the team presented the FEIS alignment and the identified design deficiencies, improvement opportunities and the design standards that would be utilized in the development of the alternatives.

An open house was held in November 2000 to present the 1997 FEIS alignment to the public. The team used this open house to gather further comments on improvement opportunities and concerns the public had on the FEIS alignment.

At the second Design Advisory Group meeting in December 2000, the team presented a list of concerns and comments from both the previous Design Advisory Group meeting and the November open house. It also outlined the timeline the team would be following to develop alternatives based on the identified concerns and improvement opportunities.

Evaluation Phase (June 2001 – March 2002):

The evaluation phase narrowed down the speculation list. The team listed the advantages and disadvantages for the ideas that warranted further development.

By the time of the third Design Advisory Group meeting in June 2001, the team had progressed through the Evaluation Phase and presented the alternatives that the team considered viable options for the development phase. The DAG was asked to seek input on the alternatives from their constituents.

For the fourth Design Advisory Group meeting in August 2001, the team presented updates and asked for comments and additions to the evaluation matrix that would be used to select our preliminary alignment alternative.

Between August 2001 and September 2001 the Project Office and team continued to meet with the various Neighborhood, City governing bodies and local agencies. From these meetings the team developed an alternative for the Liberty Park Interchange area that addressed both the City and Neighborhood concerns and provided the flexibility for the future downtown viaduct design study.

In September 2001 a second open house was held to present the Liberty Park, Thor/Freya and Trent Avenue Interchange configurations along with the Collector-Distributor and NSC connection alternatives. The information from this open house was used to validate and initiate further investigation before the team made their final recommendations to the WSDOT Eastern Region and to FHWA.

Development Phase (November 2001 – November 2002):

The team developed the alignments and interchange configurations for the alignment options that had the most potential. The following recommendations were developed for Phase 2 of the NSC project:

Recommendation #1 - Design the FEIS Modified Design at the Liberty Park Interchange including a new Helena Overcrossing *(See attached additional information "Value Engineering Recommendation #1)*

Estimated Savings: $55.2 Million

During the speculation phase, 22 alternatives were designed for the Liberty Park Interchange. Of these 22 brainstormed alternatives, 13 alternatives, including the design presented in the 1997 Final Environmental Impact Statement (FEIS), were evaluated by the team based on ten criteria such as minimizing 4F impacts, qualitative cost, visual & noise impacts, traffic operations, etc. From these 13 alternatives, 5 alternatives were selected for further analysis.

During this analysis, the team presented these 5 alternatives to the Design Advisory Group and to both East Central and Chief Gerry Neighborhoods. Additional meetings were held with the City Planning staff, City Planning Commission, City Public Works Sub-committee, Citizens Advisory Committee on Transportation, and the cities Design Review Committee. From these meetings, WSDOT received a lot of negative feedback on the alternative for a Tight Urban Diamond connection at Liberty Park. Individual letters from businesses and residents were written to the Governor, Spokane City council and Mayor of Spokane, regarding this alternative. As a result of these meetings the team developed a sixth alternative similar to the existing interchange that could function with the NSC connection and still be flexible enough to tie into a future downtown viaduct improvement.

An open house was held in September 2001 to present and gather input on the 6 alternatives selected during the evaluation phase. Based on the comments received, the public preferred option was the FEIS modified design.

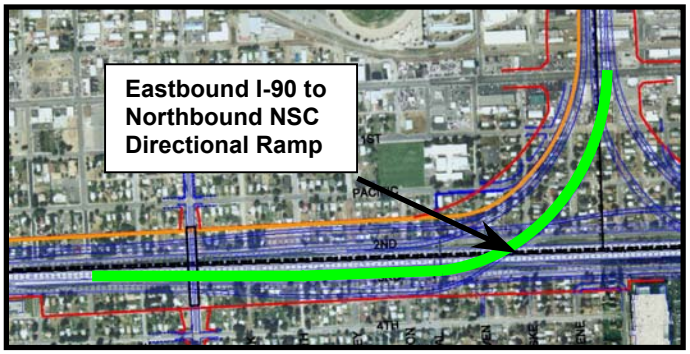
An evaluation matrix of environmental & operational impacts including land and cost was developed to select the preferred alternative based on 18 different criteria of environmental, operational aspects, land, and cost. Based on this evaluation matrix and the input from the public, the FEIS modified design was selected as the preferred alternative.

Also, one aspect common to all of the alternatives was the revised location of the eastbound off-ramp to the collector-distributor. The off-ramp to the C-D in the FEIS was at the same location of the existing eastbound Hamilton Street off ramp. This three lane off-ramp ran adjacent and above Liberty Park. The proposed design moves this three-lane off-ramp to the vicinity of Helena Street, which reduces visual impact of the three-lane off-ramp next to Liberty Park and to the residents on the bluff adjacent to the park.

Recommendation #2 - Move the eastbound Collector Distributor off-ramp location to the vicinity of Helena Street and add an eastbound I-90 to northbound NSC directional ramp

Additional Estimated Cost: $4.8 Million

The current Access Point Decision Report for the section of I-90 from Division Street to the Liberty Park interchange showed a level of service on mainline I-90 to be acceptable in the year 2020. Proposed changes to and the updated traffic modeling for the Division Street access point decision report for the year 2025 showed this same section of I-90 to have an unacceptable level of service in this section. In order to help mitigate this problem, an eastbound I-90 to northbound NSC ramp connection was added to reduce the large volume of traffic exiting to the C-D for access the NSC.



Recommendation #3 - Lower the profile of the Collector-Distributor in the vicinity of Thor and Freya *(See attached additional information "Value Engineering Recommendation #2)*

Estimated Savings: $52 Million

In the vicinity of the Thor/Freya interchange, the FEIS showed the collector-distributor going over Thor and Freya streets, while I-90 went under. With this configuration, the directional ramp connections from I-90 and the C-D would have to be above the C-D, and the crossing directional ramps would be stacked above the C-D, which would create a four to five level interchange. The levels would be: Thor/Freya above I-90, the C-D above Thor/Freya, the eastbound to northbound directional ramp above the C-D, and the southbound to eastbound directional ramp above this one. Assuming a 25' clearance for each level, the directional ramp structures would be between 50' and 75' above the existing ground level at Thor/Freya (75'-100' above I-90). By lowering the C-D to the level of I-90, it would reduce one of these levels and thus reduce the amount of visual and noise impacts associated with the directional ramps and the C-D to the surrounding neighborhood. Also, lowering the profile of the C-D would increase the amount of available material that could be used to construct some of the directional ramps and some of the NSC on fills instead of building everything on structures.

Recommendation #4 - Revise the I-90 alignment from Liberty Park to Thor/Freya to avoid the Qwest Keystone Exchange Building *(See attached additional information "Value Engineering Recommendation #4)*

Estimated Savings: $79 Million

The FEIS identified the Qwest Keystone Exchange central office located on Third Avenue on the southside of I-90 as being within the I-90 C/D route footprint. The Keystone building is the central point for all switching for 35,000 customers, and all cables converge at this location. The team met with representatives from Qwest and received an updated estimate of 80 million dollars to relocate this building.

One of the commitments in the FEIS document states that, "It may be that the route can be shifted slightly to the north to avoid the Keystone Exchange central office."

The primary reason why the FEIS document did not investigate the shift to the north was the impact associated with Your Place Park on the north side of I-90. The shift in the alignment would impact additional property at Your Place Park on the north side of the I-90 corridor. The mitigation for this additional impact will be covered by a 4F supplement prepared by WSDOT.

Recommendation #5 - Lower I-90 in the vicinity of Altamont Street and raise Altamont over I-90 *(See attached additional information "Value Engineering Recommendation #5)*

Estimated Savings: $2.2 Million

It was determined that because of the alignment revision described in proposed Recommendation 4 that shifts I-90 to the north and requires a complete rebuild of I-90, it afforded the flexibility to make a revision to the I-90 profile in this area.

One of the themes that came from the public involvement was to investigate lowering the profile of I-90 below the existing Altamont Street elevation.

Investigation of this option revealed that the mean elevation of the aquifer would be above the elevation of the new roadway if it were lowered 25'-30', which made this option not feasible.

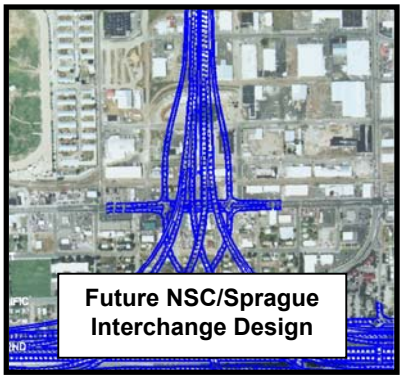
Another problem with this option was the Qwest major utility crossing that would be impacted at Crestline Street. Qwest estimated the cost to replace this crossing at $3.5-$4 million, and they would be impacting service to their customers during the construction of this new crossing which they would prefer to avoid.

With this background information, an option was developed that lowered the I-90 roadway to the elevation of the existing Altamont Street, and Altamont Street was raised over I-90. This option was compared against the current FEIS design, which had I-90 remaining in a fill over Altamont. The information was presented at public focus group meetings for the East Central Neighborhood to gather their input on their preference of the two options. The results of this meeting showed a preference for the Altamont over I-90 option based primarily on pedestrian safety (no tunnel) and trying reduce the visual impact of the corridor to the adjacent neighborhood.

Recommendation #6 - Reserve the right of way footprint for a possible future NSC/Sprague Avenue I/C

Additional Estimated Cost: $1.0 Million

Based on public comments, access from the local neighborhood and the South Hill to the NSC was an issue. The nearest access to the NSC for this traffic is the interchange located at Trent Avenue, an additional 1-¼ miles north on the city arterials. Various alternatives were brainstormed to provide a direct ramp connection, possibly slip ramps from the Thor/Freya arterials. It was determined that adding slip ramps onto the directional ramps within the I-90/NSC interchange area would result in a substandard interchange design. The NSC/Sprague Avenue interchange alternative was developed to provide access to the corridor even though it would not be a direct access. A tight urban diamond was used to investigate the feasibility of this connection.

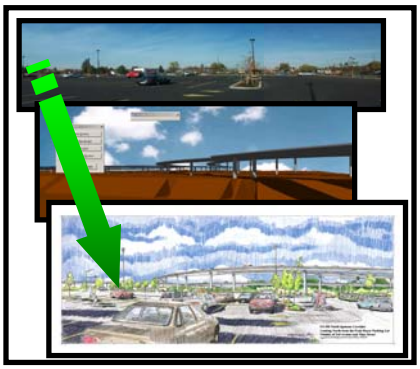


Investigation of this connection resulted in a conflict with the Union Pacific Railroad mainline track which is located approximately 180' to the north of Sprague Avenue. To the north of this mainline track, there are multiple spur lines that service various industrial businesses in the area. Also, this mainline track corridor is also being considered as an east-west light rail corridor.

A study currently underway called "Bridging the Valley" moves the UPRR mainline track out of this corridor, but the timeline for this study is beyond the timeline of the plan preparation for this project. If, in the future, the results of the Bridging the Valley study are pursued and the UPRR mainline is out of the corridor, the light rail line could remain in its current location and be lowered below the ramps on a steeper profile (up to 5%) without impacting the at-grade track crossing at Freya Street. With this in mind, it was decided to only reserve the right of way footprint for a possible future Sprague Avenue I/C connection.

These recommendations were presented to representatives from FHWA and the State Value Engineering Manager in December 2002.

INNOVATION - DESIGN VISUALIZATIONS



Another method used to solicit comments from the public and the Design Advisory Group was through the use of design visualizations. Design visualizations were created in different ways. One method was to take a photograph from a location looking towards the new project, and then a computer graphic was developed of the proposed design from this same viewpoint to overlay onto the photo. These two graphic pieces were sent to an artist combine into a sketch of the proposed alternative (see example on this page). Another method used to create a design visualization was to create the entire three dimensional design alternative using the computer design software (see Recommendation #5 – Altamont over I-90). With the addition of cars, buildings, and pavement striping, the 3D design visualizations aided in presenting the design alternatives to the public for comments.

INNOVATION - SCALE MODEL

An original scale model of the initial design presented in the Final Environmental Impact Statement was developed and presented to the Design Advisory Group and the public at an open house for comments. As alternatives progressed beyond the evaluation phase, the designs were incorporated into the scale model. The model was a vital visualization tool to present the project. Because this was an extended VE study developed over a 24 month time period, the team had the time to continually update the model as the evaluations were developed into recommendations. The model was constructed out of a 1/8"foam board with the aerial photo plot glued to the foam board. Each plot was cut out along the existing and proposed ground contour lines, beginning with the lowest contour and building up to the highest contour. The existing ground contours were derived from aerial photogrammetry survey data and topographic ground data from the USGS database. Using computer design software (CAiCE and GEOPAK), the proposed design was cut into the existing ground contours to create proposed ground contours. This model allowed the public to grasp the design of the I-90 C-D system and the NSC.